AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-25. (Canceled)

26. (Currently Amended) A supramolecular polymer comprising quadruple hydrogen bonding units within the polymer backbone, wherein at least a monomer comprising a 4H-unit is incorporated in the polymer backbone via at least two to four reactive groups ~~up to four reactive groups~~, and the 4H-units are incorporated in the polymer backbone by two covalent bonds,

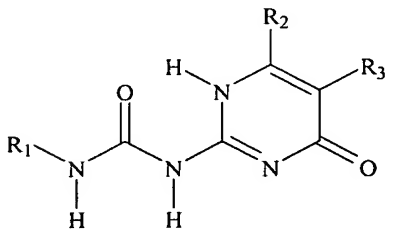
wherein the monomeric unit (a) has a structure according to formula (III) or (IV):

$4H - (F_i)_r$ (III)

$4H^* - (F_i)_r$ (IV)

wherein F_i comprises a reactive group linked to the 4H-unit or 4H*-unit; and r is 2;

wherein the monomeric unit (a) is represented by formula (VIa):



(VIa)

wherein:

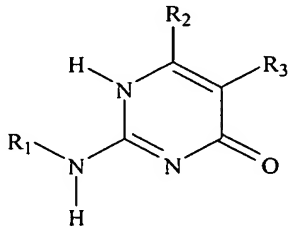
the 4H-unit is connected to a reactive group (F_1) via R_1 and a reactive group (F_1) or (F_2) via R_2, whereas R_3 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to a reactive group (F_1) via R_1 and to a reactive group (F_1) or (F_2) via R_3, whereas R_2 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to two reactive groups (F_i) both via R_1, whereas R_2

and R_3 are random side chain or hydrogen atoms, the random side chains being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; and

wherein the monomeric unit (a) is represented by formula (VIIa):



(VIIa)

wherein:

the 4H-unit is connected to a reactive group (F_1) via R_1 and a reactive group (F_1) or (F_2) via R_2, whereas R_3 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to a reactive group (F_1) via R_1 and to a reactive group (F_1) or (F_2) via R_3, whereas R_2 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; and

wherein $R_1 - R_3$ are selected from the group consisting of hydrogen atoms and shorter or longer chains, the longer and shorter chains being selected from the group consisting of saturated or unsaturated, branched, cyclic or linear alkyl chains, aryl chains, alkaryl chains, arylalkyl chains, ester chains or ether chains.

27. (Currently Amended) The supramolecular polymer according to claim 26 comprising quadruple hydrogen bonding units in the polymer backbone, said supramolecular polymer (c) and (c') having a structure according to formula (I) or formula (II), respectively:

$\{(a)_p-(b)_q\}_v$ [I]

$\{(a)_p-(b')_q\}_w$ [II]

wherein:

(a) is a monomeric unit that comprises a precursor of a 4H-element;

(b) is a macromonomeric unit;

(b') is a fragmented part of the original polymer (b);

(a) and (b) are covalently connected~~, preferably covalently,~~ in the polymer backbone;

p and q indicate the total number of units of (a) and (b) or (a) and (b') in the polymer backbone;

p is 1 to 100;

q is 0 to 20;

v is the number of repeating units of the connected monomeric units (a) and the connected macromonomeric units (b);

w is the number of repeating units of the connected monomeric units (a) and the connected macromonomeric units (b');

macromonomeric unit (b) has a number average molecular weight of at least about 100 to about 100,000;

macromonomeric unit (b') has a number average molecular weight of at least about 50 to about 20,000;

polymer (c) has a number average molecular weight of about 2,000 to about 80,000;

polymer (c') has a number average molecular weight of about 2,000 to about 80,000.

28. (Canceled)

29. (Previously Presented) The supramolecular polymer according to claim 27, wherein the macromonomeric unit (b) comprises two to six complementary reactive groups.

30. (Previously Presented) The supramolecular polymer according to claim 27, wherein the amount of 4H-units incorporated in the polymer backbone is about 33 to about 66 mol %, based on the total amount of moles of (a) and (b) or (a) and (b').

31-32. (Canceled)

33. (Previously Presented) The supramolecular polymer according to claim 27, wherein the macromonomeric unit (b) is represented by formula (V):

$P–(F_i)_s$ (V)

wherein:

P represents a polymer chain having a number average molecular weight of 100 to

100,000;

F_i represents a complementary reactive group in the macromonomeric unit (b) that is complementary reactive with another F_i of monomeric unit (a); and

s represents the number of these groups in the macromonomer and is 0 - 6.

34-37. (Canceled)

38. (Previously Presented) The supramolecular polymer according to claim 27, wherein the macromonomeric unit (b) has a structure according to formula (VIII):

F2 - P - F2 or F1 - P - F2 (VIII)

wherein:

P is selected from the group consisting of polyesters, polyether, polycarbonates and hydrogenated polyolefins; and

F_1 and F_2 are independently selected from the group consisting of -OH, $-NH_2$, -NCO and $-C=CH_2$.

39. (Previously Presented) The supramolecular polymer according to claim 38, wherein P has a number average molecular weight of 100 to 100,000.

40. (Previously Presented) The supramolecular polymer according to claim 38, wherein P has a number average molecular weight of 5,000 to 100,000.

41. (Withdrawn/Currently Amended) A process for the preparation of a supramolecular polymer comprising quadruple hydrogen bonding units within the polymer backbone, wherein at least a monomer comprising a 4H-unit is incorporated in the polymer backbone via at two to four reactive groups ~~up to four reactive groups~~, and the 4H-units are incorporated in the polymer backbone by two covalent bonds, the process comprising:

reacting a monomeric unit (a) having a structure according to formulae (III) or (IV) with a macromonomeric unit (b) having a structure according to formulae (V)

wherein the monomeric unit (a) has a structure according to formula (III) or (IV):

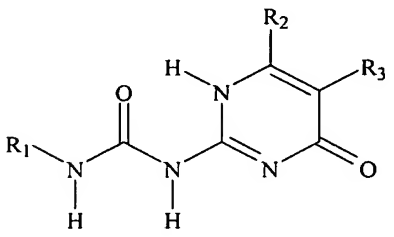
$4H - (F_i)_r$ (III)

$4H^* - (F_i)_r$ (IV)

wherein F_i comprises a reactive group linked to the 4H-unit or 4H*-unit; and

r is 2;

wherein the monomeric unit (a) is represented by formula (VIa):



(VIa)

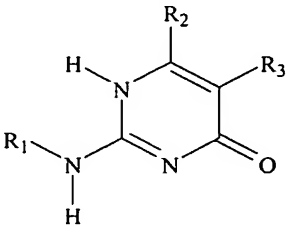
wherein:

the 4H-unit is connected to a reactive group (F_1) via R_1 and a reactive group (F_1) or (F_2) via R_2, whereas R_3 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to a reactive group (F_1) via R_1 and to a reactive group (F_1) or (F_2) via R_3, whereas R_2 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to two reactive groups (F_i) both via R_1, whereas R_2 and R_3 are random side chain or hydrogen atoms, the random side chains being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; and

wherein the monomeric unit (a) is represented by formula (VIIa):



(VIIa)

wherein:

the 4H-unit is connected to a reactive group (F_1) via R_1 and a reactive group

(F_1) or (F_2) via R_2, whereas R_3 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; or

the 4H-unit is connected to a reactive group (F_1) via R_1 and to a reactive group (F_1) or (F_2) via R_3, whereas R_2 is a random side chain or a hydrogen atom, the random side chain being a linear, cyclic or branched alkyl group comprising 1 to 7 carbon atoms; and

wherein $R_1 - R_3$ are selected from the group consisting of hydrogen atoms and shorter or longer chains, the longer and shorter chains being selected from the group consisting of saturated or unsaturated, branched, cyclic or linear alkyl chains, aryl chains, alkaryl chains, arylalkyl chains, ester chains or ether chains.

42. (Withdrawn) The process according to claim 41, wherein the monomeric unit (a) and macromonomeric unit (b) are selected from the group consisting of:

F_1-4H-F_1 and F_3-P-F_3;

F_1-4H-F_2 and F_3-P-F_3;

F_1-4H*-F_1 and F_3-P-F_3; and

F_1-4H*-F_2 and F_3-P-F_3

wherein F_1 - F_3 and F_2 - F_3 are complementary reactive groups.

43. (Withdrawn) The process according to claim 41, wherein the reactive groups F_i are selected from the group consisting of -NH_2, -NHR, -NCO, blocked -NCO, -OH, -C(O)OH, and -C(O)OR wherein R is a linear or branched C_1-C_6 alkyl group, a C_6 - C_{12} arylgroup, a C_7 - C_{12} alkaryl group or a C_7 - C_{12} alkylaryl group, or R is halogen atom selected from the group consisting of Cl, Br and I.

44. (Withdrawn) The process according to claim 41, comprising two or more macromonomeric units (b) each having a different number average molecular weight.

45. (Withdrawn) The process according to claim 41, comprising two or more macromonomeric units (b) each having a different molecular structure.

46. (Withdrawn) The process according to claim 41, wherein the monomeric unit (a), the macromonomeric unit (b), or both comprises a stopper moiety having the formula P-F_1, 4H-F_1 of 4H*-F_1.

47. (Withdrawn) The process according to claim 41, wherein the monomeric unit (a) or the macromonomeric unit (b) comprise branching species, said branching species having the formula P-$(F_i)_u$ or 4H-$(F_i)_u$ or 4H*-$(F_i)_u$, wherein u is an integer between 3 and 6.

48. (Withdrawn) The process according to claim 41, wherein the molar ratio between monomeric unit (a) and macromonomeric unit (b) is between about 1:2 and about 2:1.

49. (Withdrawn) The process according to claim 41, wherein monomeric unit (a) and macromonomeric unit (b) are selected from the group consisting of:

F_1-4H-F_1 and P; and

F_1-4H-F_2 and P.

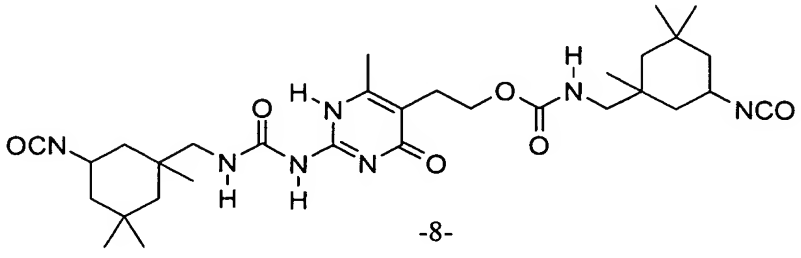
50. (Withdrawn) The process according to claim 49, wherein P has an number average molecular weight of between 5,000 and 100,000.

51. (Withdrawn) The process according to claim 49, wherein the molar ratio between monomeric unit (a) and macromonomeric unit (b) is between about 3:1 and about 10:1.

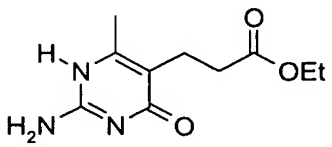
52. (Withdrawn) A product comprising a supramolecular polymer according to claim 26, in which the product is for personal care, surface coating, imaging technology, biomedical application, (thermo)reversible coating, adhesive, sealing composition, thickening agent, gelling agent or binder.

53. (New) The supramolecular polymer according to claim 27, wherein (a) and (b) are connected covalently in the polymer backbone.

54. (New) The supramolecular polymer according to claim 26, wherein the monomeric unit (a) is



55. (New) The process according to claim 41, wherein the monomeric unit (a) is



56. (New) The process according to claim 41, wherein the monomeric unit (a) is